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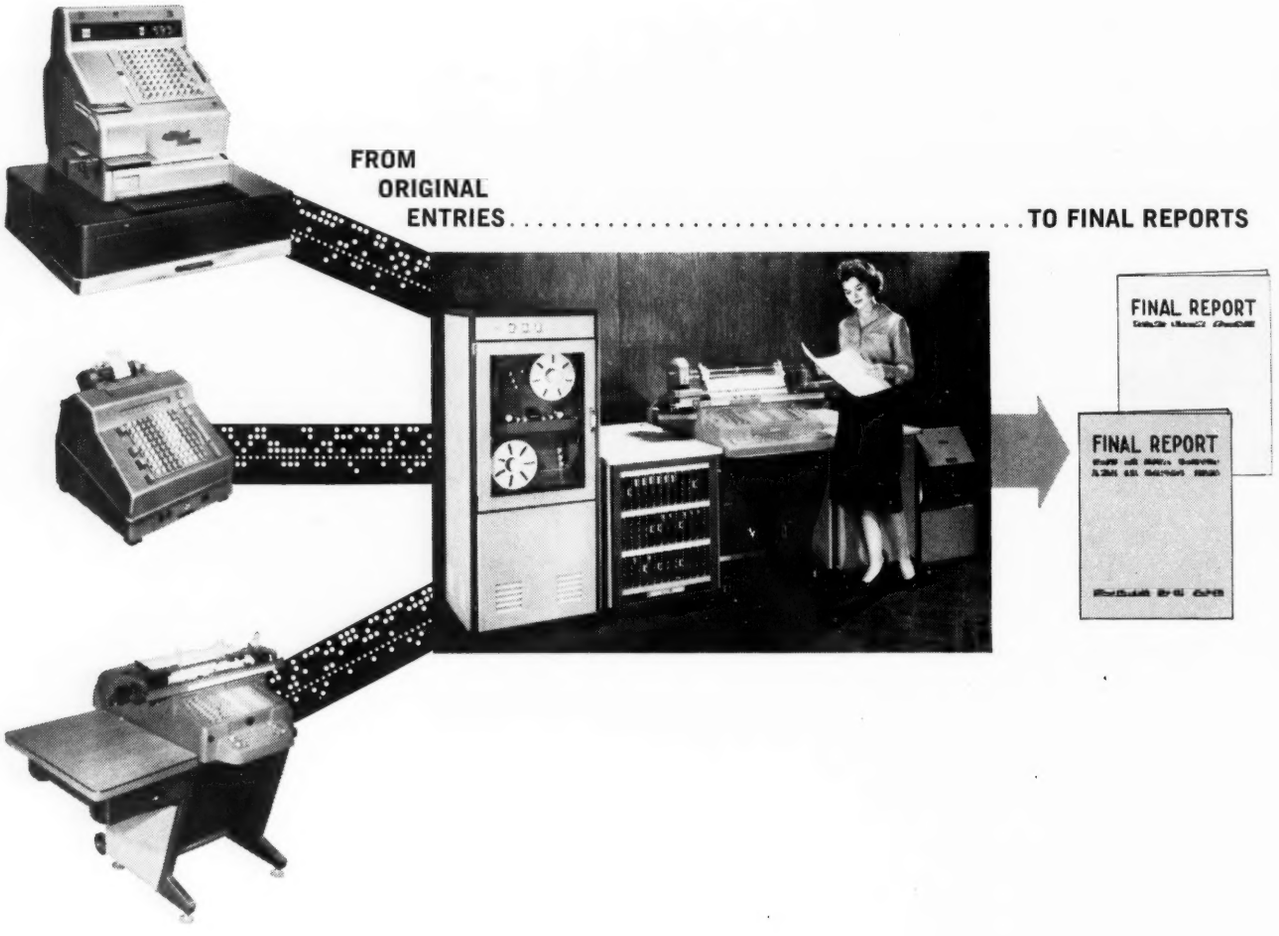

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How to Organize for a Total System

Progress from workable subsystems to their eventual integration into a major corporate total system

James M. Ewell

● The "total systems" concept is implemented in different ways by different companies. For example, it is reported that Bell Helicopter's cuts across existing department boundaries, bringing all major operating systems into one functional organization so that in processing orders for helicopters which do not require new engineering design, Bell

> ". . . has only to state the basic order information in punched card form. From this, the computer develops all data necessary to carry out the interrelated functions of buying, receiving, storing, production scheduling, dispatching and control, shipping, billing, and accounting. Optional management decisions are entered, on the basis of human editing, only after all the basic data processing work is done to carry out all the above functions."

The Shell Oil Company reports that it is on the threshold of a completely integrated management information system that will encompass point of sale of petroleum oil products at the plant level through final financial consolidation of figures by Shell's data processing center in New York.

Mr. Lach of Western Union states:

> "Display devices will be employed in what we might call management decision-making rooms. The present organization

practice of putting our sales managers, comptrollers, treasurers, purchasing agents, production planning managers, and quality control managers into separate rooms and separate departments will be changed drastically. The total systems concept requires that these employees function as a team, working together, analyzing the company's productive efforts, the effect on inventory, the company's sales efforts, and the associated effect on inventory and capital investment. When we achieve real team performance with the members playing from the same set of rules and the score board showing the total

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Mr. Ewell has an active community record. He has been chairman of divisions in the United Appeal, 1959 and 1960; co-chairman of the Greater Cincinnati Hospital Fund; chairman of the plans committee, Indian Hill Church; and chairman, Ohio Republican Finance Drive, Cincinnati area. He is a director of the Ohio Mechanics Institute; a trustee of the Cincinnati Children's Hospital; a vestryman of the Indian Hill Church; and a director of the Cincinnati Post, American Ordnance Association.

result as affected by the actions of individual members we will have the total systems concept."

From these examples, we see that the total systems concept is influenced by the particular business environment in which it is being studied and by the background of the person providing the definition. Total systems in some companies could well be defined as an order-shipping-billing system. Others go further to include production and inventory control, whereas Mr. Lach visualizes it as including the complete operation of a business from, in effect, the board room. The ultimate probably is the integration of all data within a business into a single curve which will be projected on a cathode ray tube in the center of the president's desk. In any event, however, the writer does not believe that integrated data processing will go so far that all present-day business organization is scrapped. He describes in this article the procedure his company, Procter & Gamble, has followed, to date, in developing a total system.

Total Systems Defined

In the writer's company, the total systems concept truly encompasses the entire business. It involves the parent company and subsidiaries made up of many line-and-staff divisions located throughout the world. It could be argued that this concept does not go far enough; that there are multiple interrelationships between our company and other companies which should be included. Our actions directly affect our suppliers of raw materials or packaging supplies, and the distributing operations of the railroad and trucking industries. Then there are the interrelationships with our numerous customers and the increasingly active interrelationship with all three levels of government—Federal, state, and local. Although such interrelations may eventually be included in a total systems concept, such an all-encompassing system would, at this time, be too big for us to handle effectively. As yet we do not know enough to install such a system. Just developing a system for the operation of the company itself provides myriad patterns of interlocking data and information flows. One cannot get his arms around anything so complex, taken as an entity, so the total system must, for analysis and handling at this time, be broken into major systems and subsystems. It is the writer's observation that too many approaches to total systems design put too much stress on specific applications and not enough on *interrelationship of systems.* Too much emphasis is placed on doing a specific job with a specific piece of hardware instead of analyzing basic information needs so as to be certain unnecessary data and reporting are not by default carried over from a manual to a mechanized system. To make concrete headway in establishing systems and not to be overwhelmed by endless complexities, start by working directly on subsystems, observing closely, of course, their interrelationship with the total business.

Justification Stressed

Since the cost of the equipment required to operate a totally integrated system is quite high, with the investment of time and people required to make worthwhile applications making it even higher, the writer's company determined at the outset that it would enter the data processing field only in those areas where a definite return was possible. This does not mean that we necessarily chose first the study which promised the greatest returns. Instead, we started by studying over-all areas to determine which would be the most rewarding and then selected subsystems in those areas which would most likely be basic building blocks upon which the entire system could be constructed. Today our applications are, on the average, yielding satisfying net savings.

Our three-phase approach then is as follows:

Phase 1, Unbiased Study. It is important that staff be responsible for the first phase—study. Too often, if line organization becomes involved in Phase 1, the study becomes warped or may have to be scuttled. A completely unbiased, objective analysis of the basic business requirements, uncluttered by tradition, is necessary. A thorough study to evolve the general design of the system in outline form and to forecast its capabilities must precede the actual proposal that a new system be originated. Needless to say, the staff study group must have the backing of top management to

open necessary doors to insure a thorough investigation.

Phase 2, Installation. When the study indicates that an area lends itself to a data processing application which will justify the effort required, it is time to take the second step, which may be referred to as *installation*. During this second phase, the broad outline developed in Phase 1 is expanded and the thoughts of operating people are determined and incorporated. To maintain an approach free of bias, our project leader during the installation phase is a staff man from data processing. The operating departments affected by the study assign representatives to his installation team to do much of the actual work. A good deal of education is often necessary at this point, but we find the arrangement well worth the time it takes. Departments not previously involved in a data processing application may receive considerable instruction at the same time that they help to develop their installations.

Phase 3, Operation. The third phase is full operation. The system, which has been completely worked out, test run, and debugged during the installation phase, now becomes a part of regular operations. The installation team disbands; operating people return to their normal duties. The staff project leader gradually backs off as the line departments learn to live with the new system. Staff people, in time, become consultants by handling day-to-day questions or needs of operating departments. Staff is, of course, continually responsible for program maintenance and for adapting specific programs to changes in hardware, techniques, or business needs.

Total Systems Organized

Often the form of organization and assignment of responsibility that prove best for a company are dependent upon its peculiar basic philosophies and upon the abilities and capacities of key personnel. Many companies have found it useful to have data processing report to the comptroller. Procter and Gamble started out this way. Later, we recognized that benefits could come from merging scientific and commercial data processing. As we incorporated more mathematical techniques into our commercial systems, therefore, we shifted the data processing responsibility. It is now joined with a number of staff operations which cut directly across all operating divisional lines and is truly *corporate* in nature.

In many organizations industrial engineering activities are quite well developed.[1] Procter and Gamble's organization has both the industrial engineering and data processing groups reporting to a vice-president who basically has staff responsibilities, believing that this provides the broadest possible approach in analyzing and prescribing for the needs of the business in the design of systems as well as a greater ease of operation and a depth which did not exist when the two groups reported separately.

Reporting Lines Established

P & G's data processing system department has a clearly stated charter to operate right across the business. As with other staff departments, its reason for existence is *service* to the over-all company and, where possible, to the greatest benefit of each area of line operation. Of course, there are times in setting up new systems when duties or responsibilities must be transferred from one line department to another to yield the optimum system. Line departments are helped, through education and discussion, to recognize the correctness of such a move. The "lead pipe" is definitely not used.

Corporate Data Center

In addition to conceiving and implementing systems, studying and recommending hardware, and setting basic policies in the systems field, there is in integrated data processing the need to operate the actual data handling equipment. For maximum results, as much data processing as possible was brought together in a center which could then be equipped with the most sophisticated equipment that could be justified. Procter & Gamble has, therefore, a corporate data processing center, operated by the data processing systems department. The center is the heart of our entire data processing system

1. The writer interprets industrial engineering as more than stop-watch production analysis and control. He thinks of it as a more sophisticated activity that involves the application of mathematics and statistics to business situations, operations research, etc.

and the seat of research on corporate systems and hardware.

Regional Data Centers

To serve the needs of the business best and to reduce the hazard of over centralization, other data centers may eventually be established at locations distant from the corporate headquarters center. Such regional centers may be either major or minor, depending on the hardware which each justifies. Naturally, they would all be linked with each other and with the corporate data center. It seems correct at this point that such a network should be operated by the data processing systems department because the systems the hardware processes touch all departments throughout the corporation from buying through manufacturing to sales and accounting.

Departmental Centers

Many intradepartmental data processing applications can be run beneficially within a line or staff department. For example, a small computer might be needed just for run-of-the-mill research problems or just for engineering problems. Or, since our advertising department handles millions of coupons used in promoting our products (it pioneered the 1/3-size punched card for this use which allows many customers to use less expensive punch card equipment), it may use small solid state computers to process the huge volume. Such departmental centers should, we think, be under the control of the department in question. Advice, guidance, and consultation are available from the corporate data processing systems department, but individual line departments should have full responsibility for the operations of their own centers.

A Corporate Approach

The method of organizing data processing activities described above does not differ greatly from that of even more advanced companies. Companies that started on other than a corporate basis have found that the way to the full development of their data processing potential has been blocked. Later shifting to a corporate approach causes great intraorganizational pain, so it is much better for a company to start right the first time and avoid having to admit failure on the first trial and ask for a second chance. It is further recommended that the data and systems activity report to a highly placed person in the organization, preferably an officer, and that the entire top management of the company clearly indicate its backing.

After two years of preliminary study and four years of actual operation, Procter & Gamble now has a corporate data center and one minor regional data center with a major regional center planned to begin operation in 1962. It is anticipated that other regional centers will follow rapidly. Studies are currently under way for similar installations in the organization's foreign markets. In the past seven years, we have increased departmental centers, operated by individual line or staff departments, from 8 to 24, six being overseas. Machine rental has increased 550 per cent in the past five years. Using order-shipping-billing as a major system building block, we are now working toward a purchase payment and cost distribution system which will lead to a third major system having to do with production scheduling and inventory control. The fourth major system, payroll and related "accountings," flows naturally into the system which has to do with employee benefit plans and policies. Stock transfer is another operational major system.

Commercial and Scientific Data Processing Merged

All the major corporate systems just mentioned fall into what may be termed the commercial area of the company's activities. At the same time, although not yet linked together to form sizeable systems in themselves, there are applications in research, engineering, and operations research. Many of the commercial systems use mathematical "packaged programs" which vary from a form of linear programming to matrix inversion and multiple regression. In the future, it will be increasingly beneficial for computer hardware to be able to handle both commercial and scientific applications with equal ease and effectiveness.

In some industries, a rather sharp distinction is drawn between commercial and scientific data processing. Commercial problems are characterized by relatively large

volumes of data manipulated by simple arithmetical procedures but subject to rather lengthy logic programs. Technical problems, on the other hand, are generally characterized by relatively small amounts of data manipulated by lengthy and relatively complex arithmetical procedures. The writer believes there is a recent tendency to merge the two fields into an area of mixed classes of problems and looks to the eventual merging of capabilities in machines that can handle equally well problems in both the scientific and commercial areas. In our corporate data center, having recognized the need to process both types of problems, Procter & Gamble has been able to use larger scale equipment which results in lower unit cost than had it pursued the two problem areas separately.

The Future

Plans at Procter & Gamble are to continue advancing the capacity and sophistication of its corporate data processing center and its various supporting centers. The capacity of present equipment installed over a year has just been increased by the addition of high speed tapes. By mid-1962, the next "generation" of large-scale computers will probably be installed to keep pace with the company's data processing requirements. A national network of interconnecting regional data centers will also be started. Each step must be justified economically before it is taken.

The Human Side

In developing a concept of total systems, it is easy to indulge in some grandiose thinking and, in so doing, overlook the effect of data processing on people. Companies such as Procter & Gamble, which have earned a reputation for dealing fairly with people, can jeopardize fine internal relations by falling prey to such thinking. Unfortunately, there is no automatic formula which will assure minimum upset as an organization adjusts itself to new systems and methods. In order that the new procedures pay for themselves, there must obviously be reduction in cost—often in wages and salaries. During a period of expanding business, the dislocation of people can be kept to a minimum between growth requirements and normal attrition. Even so, the total number of people employed is not increasing in the same proportion as the overall growth of business. This most important facet—the human side—must not be overlooked in the fascination of designing systems for operating a business.

Summation

What is meant by the term "total systems" depends on the company. Its design should be flexible so as to fit a company's peculiar requirements. The scope of a system must be broad enough so that the company does not end up with a varied collection of disconnected applications. Start working toward total systems by programming workable subsystems, but also work toward their eventual integration into major corporate systems.

Nothing helps to promote the development of total systems as much as clearly evidenced enthusiasm of top management. A clear statement should be made of its belief that systems must be corporate and not trapped within department walls. The staff group which is to spearhead the company's data and systems thinking must be given a corporate charter. Initial studies of possible systems and their design must be completely free of bias and preferably performed by the staff group having the corporate responsibility. Participation by line and operational personnel in detailing the applications and systems is good, not only because such involvement leads to pride of authorship but also because it is a tremendous educational experience. The corporate approach on major systems should not, in any way, inhibit the thinking and working of individual departments on data handling within their own group. The full potential of many minds and the good that can come from concentrated thinking on the subject in all parts of the organization cannot be developed if the corporate data department tries to hold all systems work unto itself. Encouraging an intradepartmental effort along with an interdepartmental approach provides a useful bridge from the traditional provincial departmental thinking of an organization to a realization that, for the greatest good of the business, the complexities of today's business require a total systems approach. **s/p/a**

Cost Cutting through Work Measurement

A method of developing a program for controlling office production

Elmer V. Grillo

● If one thing characterizes modern business today, large or small, it is the growing volume of paper work necessary to run it. This flood of paper and recorded information seems to be peculiar to our day. While written records are undeniably necessary to control business organizations, and indeed modern production techniques would be impossible without written schedules and the like, an increasing number of organizations are asking whether paper work is getting out of control.

In an effort to do something about the problem, one firm conducted a paper-work production survey. It discovered that the average office typist spends 10 per cent of her working day chatting or attending to make-up, 40 per cent frittering away time, and 50 per cent actually working. Another firm, a department store, in a vast desk-cleaning operation, eliminated 22 million pieces of paper a year from its administrative operations, weighing 105 tons. The store found it could eliminate time cards, catalog cards, stockroom forms, and complaint forms by relying upon the fundamental honesty of its customers and employees. One of the store officials explained that much of the information which was so carefully compiled and filed was useless, and that much of the rest came in too fast to be digested. It was concluded that ordinary observation served better than paper records in many cases.

Once a firm decides to "do something" about office and administrative costs, the basic question is: How do you know your office is efficient? People may seem to be busy. How does the average businessman know whether his office people are spending their time productively? If paper work and office costs are to be controlled, there must be some way of knowing whether the work is necessary, how long its processing should take, and how much it should cost.

ELMER V. GRILLO is adjunct assistant professor of management, New York University's Management Institute, where he directs workshop seminars. He has had over ten years' experience in office cost control activities, work standards programs, and systems and procedures work. Mr. Grillo is co-author of the book, Work Measurement in the Office. *(McGraw-Hill Book Company, 1959). He is a graduate of Brown University and the Harvard Business School. A member of the Knickerbocker Chapter, SPA, he has been vice president, secretary, program chairman, and a member of the research committee of his chapter.*

Work Measurement

Work measurement provides an answer and this article discusses certain aspects of developing such a program for controlling office production.

A program of work measurement is simply a method of setting standards to determine what a fair day's work in an office should be. It determines how much time is necessary to complete the work at hand. Although it does not give 100 per cent accurate results, it eliminates a good deal of guesswork. Nor need one be an industrial engineer to set office work standards. At least three simple techniques for determining "standards" can be used by anyone: past records, current time records or logs, and work sampling.

To develop a work measurement program, the work of the office must first be analyzed, and an orderly record made of the findings. A time allowance must then be established for every duty of any significance. Finally, a reporting system must be set up so that each week or each month every supervisor is provided with a report of actual production and time spent, compared with standard.

TIME ESTIMATE FORM

Name_____ Date_____

Position_____ Supervisor_____

DUTY	ESTIMATED HOURS PER WEEK
Daily Duties	
Weekly Duties	
Monthly Duties	
Occasional Duties (Done in spare time or at irregular intervals)	

ILLUSTRATION NO. 1

Not all types of office work, of course, are measurable by these techniques. Non-routine work—creative work, technical duties, research jobs, and supervisory and managerial work—may not come within the scope of the program. On the other hand, jobs which may seem at first glance not to be standard but variable and "different" have, after further consideration, been measured successfully. For example, correspondence work, drafting work, interviewing, and claim approving in an insurance company have been placed under work measurement programs. Even technical positions and lower or middle level supervisory positions have been found, surprisingly enough, to contain many elements which are largely repetitive and predictable so that reasonably accurate time allowances can be established for them and production measured and controlled. Sometimes, only a fraction of a position thought to be non-measurable will be found to be really intangible, with a good portion routine enough so that production standards can be set. In small offices or any office where the work is, to a large extent, truly non-repetitive, a work measurement study may still be valuable because it provides an analysis and record of how the work is performed. Changes which result in savings may be thereby instituted even though a system of measurement or production reporting is not maintained.

Standards

Standards based on estimates or past production records are possible. A form (See Illustration No. 1) is useful for this purpose. If necessary, the immediate supervisor or manager can make the estimates himself, and verify them later with his subordinates.

Every supervisor has "counts" of the volume of certain items of work produced by people under his supervision. The data gathered should yield the following type of information:

	Number	Time Spent (minutes)	Minutes per Item
Bills typed	74	247	3.3
Invoices calculated	102	211	2.1
Vouchers checked	131	199	1.5

Such standards, while admittedly unsophisticated, can be very helpful. They provide a base against which to compare future experience. They isolate areas for questioning. For example, were we *aware* that it took the time shown to handle each work item? Is it worth

TIME RECORD

Name_____ Position_____

Date_____ Department_____

OPERATION OR DUTY	PRODUCTION (UNITS OF WORK)	TIME		TOTAL MINUTES	UNIT TIME
		START	STOP		
A	15	9:00	9:30	30	2
B	2	9:30	9:40	10	5
Rest Period		9:40	9:50	10	
C	10	9:50	11:00	70	7

ILLUSTRATION NO. 2

it? Are certain duties handled by too highly paid employees? For example, did we find stenographers spending too much time filing or distributing mail? Are skilled employees often acting as their own messengers?

An office should select only the better, more steady employees for estimating standards, employees who are neither fast nor slow, but who normally maintain a steady pace throughout the day.

Time Records

Each employee should be asked to maintain for several days production records and a time breakdown for an entire working day. The record should indicate the number of units of each type of work produced, the time required to complete each type, and the amount of time taken for rest, lunch, and interruptions. While this information is being gathered, employees should be observed occasionally during the day to ensure that a steady, normal work pace is being maintained and that the time records are being completed properly. If desired, the records of only selected employees can be used to be sure that results represent what a fair day's work should be. Illustration No. 2 shows a typical record sheet which might be used.

From the information gathered, we get a sort of profile of each job and can also establish an overall personal allowance. For example, assume that in a normal working day of eight hours or 480 minutes, the lunch period and official rest periods amount to 60 minutes. From time records submitted by employees, we observe that about 30 minutes per day is the allowance needed for personal use.

$$\frac{30}{480 - 60} = \frac{30}{420} = 7 \text{ per cent for personal allowance}$$

This means that we add 7 per cent to each production standard to determine a final standard time.

Such a technique has the following advantage: It provides a complete record of how time is spent, recorded by the employees themselves. On the basis of these records, management can obtain information about work cycles, typical batch sizes and their effect on production, the reasons for miscellaneous duties, and the extent of lost time.

Work Sampling

Another technique of establishing standards is referred to as work sampling and

WORK SAMPLING

	(1) NO. OF OBSERVATIONS	(2) % OF TOTAL	(3) MINUTES	(4) WORK VOLUME	(5) STANDARD UNIT TIME
Duty A	160	53%	1113	2671	2.4
B	44	15	315	1102	3.5
C	38	13	273	992	4.0
Away from Desk	6	2	42		
Idle—No Work	24	8	168		
Personal Time	28	9	189		
Total	300	100%	2100		

ILLUSTRATION NO. 3

consists of making observations of a group of employees at random times during the day, noting each time what they are doing. Let us assume that observations are made of a group of five clerks for one day. Each works a normal seven-hour day (excluding lunch) or 420 minutes. Together, they represent 2100 minutes of available production time. An observer—say, the supervisor—makes 300 observations during one day. His findings, are shown in Column 1, Illustration No. 3. Column 3 shows the total time (5 clerks) spent on each duty as observed by the supervisor that day. The supervisor maintains a record of the quantity of work produced by the entire group during the day, and this is posted to Column 4. Divide Column 4 by Column 3 to obtain a work standard for each duty (See Column 5).

Work sampling is the technique of taking a relatively small number of observations at random. Random samplings tend to give the same results as if employees had been observed continuously. It can be demonstrated statistically that if enough observations are taken of a situation—in this case, a group of five clerks—the results approximate the proportion of time employees actually spend in various activities. The technique has gained wide acceptance because it makes it possible for busy office supervisors to tally work with a minimum of disturbance to production routines.

A Reporting System

A system for reporting results so that management will know how well the organization is meeting production standards, and where trouble areas may be, is a necessary part of a work measurement program. Such a report may take many forms (See Illustration No. 4). Fundamentally, it shows the relationship between time at standard allowance and actual time worked, expressed as a ratio or percentage. Such a report may be prepared daily, weekly, or monthly.

Uses of Measurement

Work measurement has been used successfully by many office managers to help solve

PERFORMANCE REPORT

Department_____ Time Period Covered_____

DESCRIPTION	ITEM COUNTED	STANDARD UNIT TIME (MINUTES)	ACTUAL VOLUME	STANDARD TIME
Letters dictated	letter	12.5	88	1104
Forms typed	form	7.8	138	1078
Cards filed	card	.5	500	250
Total Standard Minutes				2432
Actual Minutes Spent (Per attendance records)				3000
Performance Rate				81%

ILLUSTRATION NO. 4

a number of supervisory problems. The following examples, some involving small firms, show that measurement provides facts for small as well as large offices.

Example No. 1. One firm, forced to reduce its work force because of the curtailment of contracts, observed that the work of the office division did not necessarily decrease in proportion to the work of the rest of the firm. The office manager made a work measurement study over a period of several weeks to determine just how office time was being spent. On the basis of this information, adjustments were made which combined duties and eliminated unnecessary work.

Example No. 2. An office manager was about to invest in some new office equipment, but decided first to make a study of his operations. In his study he included some of the proposed equipment on a test basis. This review showed that many of the present office activities were unnecessary and could be eliminated, and that many of them required essentially the same amount of time to perform on the proposed equipment as on present equipment.

Example No. 3. As the company expanded, the head of a small, rapidly growing firm assigned duties to anyone who seemed to have the time or ability to handle them. He realized finally that some "empires" had been built to too great an extent around particular people. Accordingly, a work measurement study was conducted to determine whether work should be delegated to other departments or people, whether there was need for additional help, and whether work which needed to be done was being performed efficiently.

Example No. 4. One firm prided itself on its record of quick service to customers. Since orders were received in fluctuating volumes from day to day, a good-sized staff had to be maintained to meet all eventualities. A work measurement study showed that the cost of the policy of quick service was a good deal more than management had ever realized.

With information from the work measurement study, adjustments were made in scheduling, some duties were reassigned, and modifications were made in the service policy at a considerable saving to the company.

s/p/a

ANNOUNCEMENT

Beginning with the current award year, the PRICE WATERHOUSE AWARD will be made to the author of the article selected by a committee of judges as being the best article appearing in SYSTEMS AND PROCEDURES during the award year. In making the evaluation the judges use an appraisal system which contains sixteen review areas with a maximum point total of 110. The award consists of a check for $500 and a scroll containing the name of the award winner and a suitable citation.

In addition to being eligible for the PRICE WATERHOUSE AWARD, authors whose articles appear in SYSTEMS AND PROCEDURES, beginning with the January/February, 1962 issue, will receive honorariums after publication of the article. It is hoped that this policy will result in the submission of so many articles it will be necessary to increase the frequency of publication.

Organizational Relationships

Management now wants action and results—profitable results

Norman J. Ream

● *Operations Research—Systems Planning —Data Processing*—these three terms are used in progressive management. What are their interrelationships? What part will each play in the development of better management information? These questions have entered all our minds as we participate in the planned development of our individual managements.

To confuse the picture, we have such additional terms as *Integrated Data Processing* (IDP), *Automatic Data Processing* (ADP), *Electronic Data Processing* (EDP), *Systems Engineering*, and *Organization Engineering*. In fairness to those who originated these terms, they have probably served a worthwhile purpose in that many of them were "catch" terms and did incite management interest. They made management aware of major areas for improvement that existed in their organizations. However, this writer believes that it is time we drop much of this "Blue Sky" jargon of the '50's.

Management now wants action and results —profitable results.

Need for Integrated Management

Before considering the organizational relationships of operations research, systems planning, and data processing, let us consider the objective of the present active interest in the improvement of management practices and techniques. The main objective is the development of a truly integrated organization.

Today business consists of such "functions" as business profit, risk, product, investments, and customer relationships. The work in each functional area is best done by people who specialize. A basic problem, then, is how to transmute functional knowledge and functional contributions into general direction and profitable general results.

The problem of satisfactory integration among business functions has so far escaped solution. Research and development are needed, but this will not be easy. We must recognize that we are faced with the problem of developing a means of measuring and controlling a complex assortment of interacting groups of variously motivated entities in a flux of decision-making situations that comprise a normal company.

Responsibilities of Management

We can define the responsibilities of all management as the guidance, leadership, and

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control of a group of individuals toward a common objective. This broad definition indicates a purpose, but does not say how results are to be obtained. The responsibilities of management may be further clarified by examining five basic responsibilities:

1. *Plan.* To plan is to determine what shall be done. It includes decision-making activities clarifying objectives, establishing policies, establishing programs, and determining specific methods and procedures.

2. *Organize.* To organize is to group homogeneously the activities which are necessary to carry out plans in functional management units and to define relationships among executives and workers in such units.

3. *Assemble Resources.* To assemble resources is to obtain the personnel, capital, facilities, and other requirements needed to execute established plans.

4. *Direct.* To direct is to issue management directives. This involves establishing standards, motivating people to achieve the standards, comparing actual results against predetermined standards, and initiating necessary corrective action when performance deviates from the plan.

5. *Control.* To control is to see that operating results conform as nearly as possible to established plans. This involves establishing standards, motivating people to achieve the standards, comparing actual results against predetermined standards, and initiating necessary corrective action when performance deviates from the plan.

Managers are usually divided according to such functional specialties as sales, research and development, engineering, manufacturing finance, and industrial relations. Each of these engages in the five basic processes of management first discussed. All management engages in these processes although the amount of time spent on each depends on the level of management at which one is operating. For example, the vice-president of engineering must plan, organize, assemble resources, direct, and control in the same manner as any other member of management. His problems may differ in degree and feature, but they are interrelated and interdependent with problems of the other management echelons.

Increase in the scope and complexity of modern business has caused management to recognize the need for improved management techniques. Management recognizes that simplifying processes must move forward in balance with business complicating processes. Unless simplifying processes keep pace, we will become a casualty of our self-developed economic and business complexity.

Planned Management Information

If the basic problem facing management is the development of simplified, integrated management structure, it seems axiomatic that the contributions of the various levels of management must be integrated and focused by means of a centralized management intelligence and information system. This can be developed through decision criteria which, when followed, help to make decisions in all parts of the organization which are most profitable or desirable for the organization as a whole.

Criteria for a planned management *information system* should:

1. *Be dynamic, capable of changing to conform with shifts in the socio-economic and political environment in which the business must survive.*

2. *Provide top management with a comprehensive understanding of factors, external and internal, which influence the business.*

3. *Provide performance measurement factors for all measurable functions. At the same time, present top management with the means for overall review of company-wide operational results of a consolidated nature.*

4. *Provide information requirements for dynamic operational control in all areas of the management structure.*

5. *Provide for the continued development and application of advanced scientific management techniques.*

It is in developing management intelligence that operations research, systems planning, and data processing play their role.

Little progress has been made to date in developing compact sets of management intelligence. Almost without exception, corporations focus their attention solely on cost reduction in an effort to compensate for failing to provide balanced functional management.

Improvement efforts to date have been devoted primarily to the use of electronic data processing systems or other "hardware," as a substitute for clerical paperwork efforts. Little has been devoted to a dynamic analysis of the entire management function to determine information requirements and the interaction of components.

As a result, the usual situation within a corporation today is that the plan for information flow to the various echelons of management is not in accord with what should be available properly to carry out assigned management responsibilities. Available information is a conglomeration of both usable and nonusable information that complicates rather than simplifies decision-making. The tendency is to increase rather than decrease and refine the flow of information. This inhibits the development of an integrated management information system and continues the functionalization approach.

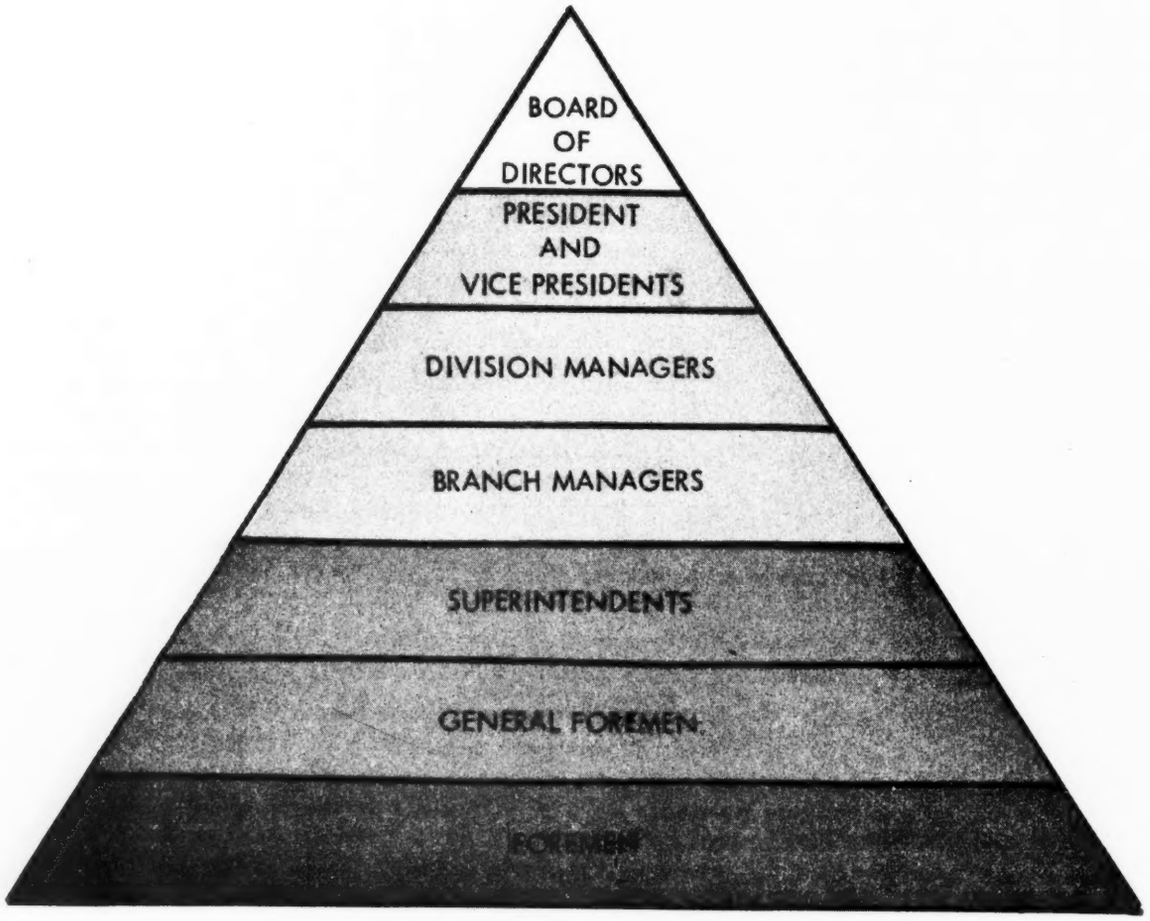
Planning delves into the future and develops what should be done; review looks back and perceives what has actually happened. Planning thinks about operations in advance; review thinks about experiences during the attempt to realize the plans. Without review, we could not profit from experience. However, review can only point out failures after they have happened, whereas planning can prevent at least some of them from happening in the first place. This observation may be at the root of a significant trend in current business practice: that is, to shift from an emphasis on review to one on planning. A dollar spent on planning is likely to bring more than a dollar spent on review. *However*, planning cannot take the place of review, for it would make little sense to plan if we did not find out how the plans materialized. Planning is a prerequisite to control. We cannot control sensibly unless we have first planned properly.

The interactions of planning and review are also emphasized by the fact that most planning tools automatically become review tools. An important characteristic of management review is its feedback to planning. It is this feedback that puts a "systems" character on management, although the management cycle is by no means a closed loop. Nor does it, fortunately or unfortunately, automatically adjust when results differ from expectations. The link—the review of past operations translated into planning for the future—is frequently the weakest of all.

Feedback of information about results is intended to make future planning sensitive to the results of previous plans. It helps management to be responsive to new conditions and new ideas. The counterpart in other areas of the natural and living sciences is regeneration.

Planning. The basic objective then of planning informational output is to evaluate a company's position with comparable entities. It includes setting forth alternate courses of action available to management under a series of predetermined premises. Subsystems involved in management planning include economic research, market research, sales planning and forecasting, product planning and design, manufacturing planning, sales promotion, personnel selection, plant and equipment selection, and procurement and budgeting. Information requirements for planning do not require the precise timeliness of those for operating controls, but they do require considerable time and attention of top management.

Operating. The basic objective of an operational control information structure is to inform functional management of the results of operations on a moment-to-moment basis. It is not possible to control an operation until



THE MANAGEMENT PYRAMID

CHART 1

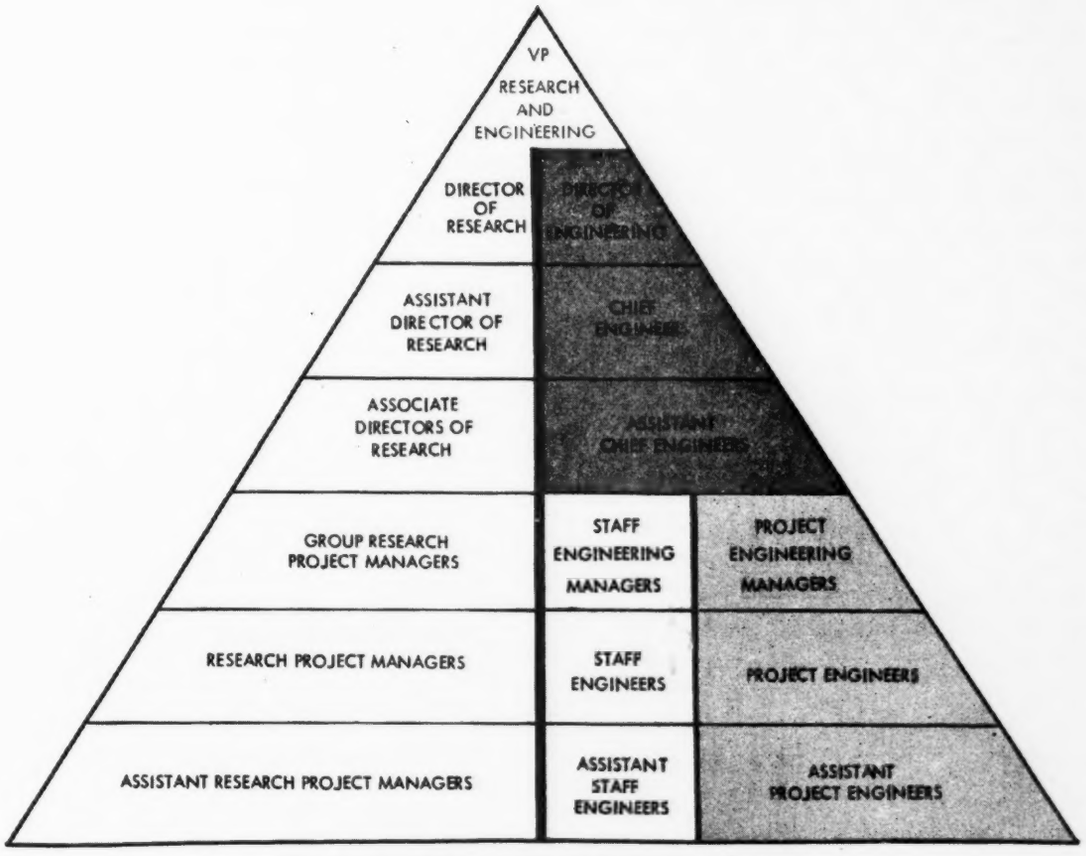
current operations become recorded history and the results are compared to the predetermined criteria and effective action is taken.

The sub-systems of operational control include purchasing, manufacturing, inventory control, sales, traffic and transportation, and a host of accounting and finance operations, such as payroll, accounts payable, and invoicing and accounts receivable.

Reviewing. The basic objective of reviewing informational output is to inform top management of functional operating performance compared to predetermined standards. Changes in planned operations can then be made as such action is required. Timeliness is important. The sub-systems involved include sales analyses and trend studies, analyses of manufacturing, quality control, cost accounting analyses, financial analyses and reports, and various special management studies.

The Management Cycle

One of the current benchmarks of a progressive management is a *recognition* of the need for a "total systems" view of management. Managing is a cyclical process containing three basic elements:



THE ENGINEERING MANAGEMENT PYRAMID

CHART 2

1. *Planned Operations.* Goals are established for an organization as a whole as well as for each of its subdivisions. Available resources—money, men, and materials—are examined to determine whether these goals are possible. Plans identify the best way in which to reach goals under established and prevailing conditions.

2. *Controlled Operations.* Alternative plans are made. Implementing instructions are discussed with all echelons of management. Activities proceed, under the direction of management, as closely in accord with plans as possible.

3. *Reviewed Operations.* Results are recorded to develop conclusions based on actual operations that will be useful in developing future plans.

These elements of management encompass basic responsibilities and are a way of thinking of management which is in contrast to earlier sales, engineering, manufacturing, and finance classifications.

The Management Pyramid

Traditionally, we say top managements carry out the planning, operating, and review phases of a business. However, in reality top managers find it necessary to devote their major efforts to planning and reviewing. They delegate operational control to lower echelons of management. This represents a delegation of authority but not a shift in basic responsibility.

Inasmuch as management encompasses many levels within a given company, we can view management as a pyramid (See chart 1).

The base of the pyramid is first-line supervision—the foreman level. Progression up the pyramid is from general foremen, through superintendents, branch managers, division managers, and group executives up to the president and board of directors. The bulk of operational decisions are made in the lower regions of the pyramid. Proceeding up, decisions change from operational to those more directly concerned with planning and reviewing. Accordingly, each successively higher level of management requires less detailed information about individual functions; the need, as we progress upward, is for a consolidation of information and reports, pointing out deviations from standards, together with analyses of causes for deviation.

In reality, top management does not exercise direct operating control. Rather, it controls by assuring that mechanisms exist for analyzing and presenting operating results together with predetermined criteria for evaluating them.

Let us look next at a pyramid which reflects engineering management (Chart 2). Usually, the top is represented by the vice-president of engineering, research, and development. Directly below him is usually a director of research and a director of engineering. The lower echelons of research and engineering management are at the bottom of the pyramid. The informational flow requirements are the same as in all of management. That is, as we progress upward, each successively higher level of management requires less detail concerning individual operations and functions, and as we approach the top of the pyramid, the requirement is for consolidation of information and reports, pointing out deviations from preestablished plans, together with an analysis of the causes of the deviations.

Performance Measurement

The result of this shift in top management efforts has led to a need for performance measurement techniques much more precise than those heretofore required. The absence of such performance measurement criteria inhibits effective decentralization and delegation of authority, and precludes the use of management by exception principles.

The establishment of performance measurement in a corporation determines action —on the part of both the measurer and the measured—and, as a consequence, directs, limits, and causes the behavior and performance of the corporation.

The types of performance measurement devised and their ultimate use determine what information will be considered relevant in the operation of a business. Unless expectation is built into our management processes in such a manner that one can determine whether or not expectations have actually been fulfilled—including a knowledge of deviations because of expectancy—management cannot plan, for it has no information feedback and no precise control of its efforts.

If we look at the performance measuring techniques which predominate today, we find that *money* and *production* are the key indicators. Measurements available are:

1. *Accounting.* Concerned almost exclusively with financial data; a review technique.
2. *Work measurement.* Involved with the time aspect of output.
3. *Production Control.* Devoted to quantitative consideration of performance.
4. *Quality Control.* Concerned with the quality characteristics of output.

Much research needs to be devoted to the development of new performance measurement techniques.

It is the exception rather than the rule when measurements in use today can stand the test of scientific accuracy. Take the dollar; its significance as a measure of value is distorted by the fluctuations of its purchasing power.

One axiom in the development of performance measures is that we must know clearly what we are after before we can determine a measure. Also, measurements need to be expressed in numerical values if they are to be useful. For this reason more factual measurements are mandatory before management can reach the state of "scientific management." **s/p/a**

Relationships

Much can be done through training to develop good personal relations

W. H. Cruickshank

● As we work in large organizations today, dozens of us together from the president to the office boy, we are all fellow employees. We work for the same company toward the same end goals. The responsibility of keeping relationships healthy and clear throughout our organization is important.

In an organization, employees deal with others in three directions: up, down, and across. One can argue that the downward direction is the most important, the one that calls for the greatest understanding and sense of responsibility. But you cannot have good and productive human relations in an enterprise if the other two are neglected. It is not enough for a supervisor to know the needs and attitudes of the people who work for him. Those who work for him must also understand the supervisor's problems. Similarly, lack of proper horizontal communication between the members of different departments can seriously vitiate the effect of good relations within each department.

Bigness in industry has forced functional specialization upon us. To achieve a common objective in a large enterprise calls for recognition of other men as associates, not as sources of interference. Unless we work together, too many of our rockets may fizzle. To establish and maintain the horizontal relationships necessary for coordinated productive effort requires an ever-increasing skill.

Good relationships cannot be forced. One cannot issue an edict and expect everyone to understand everyone else from then on. Instead, good relations in an organization result from training, counseling, and the active support of top levels of management. The program has to be quite specific and those responsible for it must work at its development.

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Dr. Cruickshank has an active community record. He was mayor of a Montreal suburban community, was general campaign chairman of the United Appeal, 1960, and is a member of the Toronto Redevelopment Advisory Council.

Two-Way Communication

The justification for the considerable effort which an active program of improving personal relations requires, is smoother, more effective operations throughout an organization. The same is true in a family, where the problems of two-way communication are also important. Let us assume, for the purpose of this discussion, that the father runs his family. If the father is unable to appreciate the motives of his teen-age son or daughter, there is revolt and disorganization. But if nobody tries to understand the father, then he won't cooperate and there is just as much trouble. Similarly, if brother and sister see themselves as rivals for parental attention or their share of the family budget, there are continual upheavals. One does not expect perfect communication and understanding, but if there is a measure of mutual understanding, it is easier for each member of the family to act as a real personality in the long run. We can assume that good personal relations make for good operating results.

There must be rivalry just as there must be discipline, and in the modern industrial society either one will diminish production if carried to extremes. The ideal is to have people happy and to have them enjoy what they are doing; to challenge them so that they are not satisfied with their achievements and are motivated to extra effort but not to the extent where unfriendly rivalry results.

Absenteeism

Other undesirable things result from unsatisfactory relations. There is, for example, the problem of absenteeism. People stay away from work because they are ill, because they believe they are ill, because they do not like their working conditions, or because they think they have something better to do. Frustrations resulting from bad or unsatisfactory personal relations are an important contributory cause. The absence of meaningful relationships may in fact be a chief cause of an employee's absence.

Turnover

Related to absenteeism is the problem of turnover—absenteeism carried to its final conclusion. As industry becomes more mechanized, the cost of training new people can rise sharply, for it is unskilled work that is being reduced or eliminated by mechanization. For example, the growing mechanization of the routing of telephone calls, long distance now as well as local, means that operators are concerned primarily with the more difficult calls, those the machines cannot handle. Similarly, maintenance of the new telephone equipment calls for a higher degree of technical ability and knowledge. It becomes more important, therefore, to hold the men and women who are trained for these tasks. Bad personal relations are a primary reason for resignations.

Public Relations

Then, there are the public relations implications that result from poor relationships within a company. The writer's company makes a regular survey of customer opinion throughout the territory and groups results under three main heads: Attitude toward service, attitude toward the cost and value of service, and attitude toward the company. It compares the views of customers who know and talk to company employees with the views of those who do not. Talking to employees has no appreciable effect on what people think of service, but it has an influence on what they think of the cost and value of their service, and a very great effect on their attitude toward the company and the efficiency of its management.

We know, therefore, that satisfactions employees find in their work are directly reflected in public opinion about the company. And we assume that an employee will not speak well of the company if he thinks badly of the people with whom he works, notably his supervisor.

Fellow Employees

How does one get to know his fellow employees better? As supervisors, how do we get to know better the people who work directly with us? To some extent, it is a question of confidence. You will not get to know someone better who does not want you to.

Admittedly, it is possible to open up an oyster with a knife, but in human relations that can be a pretty damaging technique. In human relations you must establish a climate that will make the oyster eager to open of its own accord.

How do you learn what you need to know about the other man—his wants and wishes? How can he make these clear to you? Ideally, you ask him a series of questions and everything is plain. But it does not work that way. There are too many uncertainties, too many barriers. There is too much opportunity for misinterpretation. For effective communication we must provide as objective a picture as possible, one that will aid and clarify an individual's judgment.

Surveys

In recent years the writer's company has surveyed management attitudes. The last survey was made in 1959, and included 5,893 answered questionnaires, representing 87 per cent of the supervisory people—male and female. The anonymity of the employees answering the survey was, of course, strictly preserved.

The results of the 1959 survey were compared with those of previous surveys conducted by similar companies in the United States. We used 73 questions in our survey grouped under the following sub-headings:

1. Confidence in management; covered feelings about the way the company is run and the future of the business.

2. Identification with management; measured the extent to which the individual feels part of management; the extent to which he is consulted and is kept informed by higher management.

3. Communication; do you have sufficient information about the company and its ways of doing business? Does a man feel he gets the full story about things that affect him and his job? Do you feel free to express your own thoughts? Is your own boss easy to talk to?

4. Authority; dealt with the amount of authority a man feels he has; are you often overruled? If so, are you given full understanding of the reasons?

5. Company; pride in the company; referred to the way people feel about the company and the way they talk about it. Job satisfaction; the way they feel about their present job; whether there are some things about it they particularly like or dislike. Support of company plans and objectives; position taken in discussion outside the company of service plans, rates, and financial policies. Responsibility for making a profit; whether they feel the way they conduct their jobs affects the company's earnings.

6. Supervision; attitude toward supervision; dealt with satisfaction or dissatisfaction; with the fairness, friendliness, and attention shown by the man higher up. Personal satisfactions; included the amount of work, chance to get ahead, chance to show what one can do, and the advantage of the actual job.

7. Salary administration; considered attitude towards salary, its adequacy considering the responsibility of the job and the pay in other businesses, as well as confidence in future fair treatment.

The questions under each heading were arranged in attitude scales. This helped to provide a yardstick for measuring shades of attitude between good and poor, and illuminated more complex aspects of a respondent's reactions.

A large number of the questions bore on communications. Indeed, there is practically no question that is not influenced by the quality of communications within the company. Good communication, we know, depends on a man's understanding of what others are trying to convey to him. It also depends on a man's desire and ability to make himself understood by others.

The people who contributed to our survey must, we believe, learn the results. They are entitled to know what weaknesses, if any, were revealed for the company as a whole or

for their own department. The group is then asked, "What are the problems which caused these weaknesses and what can be done about them?" If the right climate about the survey has been established, discussion at this point should be both free and fruitful. Here is a quotation from the general philosophy worked out for such sessions:

> "Considerable experience with the process of putting survey results to work indicates that feedback discussions can improve satisfactions, can help us find the causes of attitudes, can help us obtain valuable suggestions, can involve many people at all levels in the process of change, and can help supervisors to develop self-awareness.
>
> "Whether these benefits will be obtained in practice depends not so much on the specific techniques involved, but on how they are used. If the problem can be approached objectively as a search for clues, the chances for success are good. . . . Conversely, any attempt to use survey results as a measurement of groups, to compare one work group with another, to use the findings as an index to measure the efficiency of individual supervisors, may result in pressures which could have adverse results."

It is fortunate that our survey can be compared with those of similar companies. A special study comparing high-scoring with low-scoring departments in eight separate companies showed the following reasons for the better scores:

1. Greater delegation of authority.
2. Better management climate.
3. Salary treatment.
4. More frequent and widespread promotions and transfers.
5. Greater attention to supervisory training.

Individual Relationships

Let us turn now to problems of individual relationships. How can you know better the man who is working for you and give him some insight into your own attitude and problems? Probably the worst kind of boss is the one about whom it is said, "You never know what he is thinking." With an outspoken boss you at least know where you stand—and what precautions to take. The problem is to establish a relationship that promotes good communication.

Maintaining the right kind of personal relationships in a department or group is a continuing task for supervision. Awareness of it should influence day-to-day action and every decision—within legitimate limits. There are also, of course, the special occasions for emphasizing good relations such as the induction period for a new employee. The importance of a good induction program cannot be overemphasized. A great cause of personal insecurity is the uncertainty which characterizes a new situation. An employee needs a feeling of being wanted, of belonging. Whatever his or her job, its relationship to the overall task of the department or company should be explained. Where management is concerned, an effective orientation will lay the foundation for good relations with coordinates later.

Personnel Reviews

Another special occasion is the regular personnel review. These reviews have two purposes: to help the individual make the most of his abilities, and to assist the progress of the company through the wise development of those who work for it. Reviews tend to be joint projects. A supervisor discusses his people with a small group of the senior members of his department before he goes over each review with the individuals concerned. In other words, there should be no secret appraisal by the bosses—but a cooperative effort to promote good working relationships.

The whole question of appraisal interviews is getting close scrutiny these days from personnel people and psychiatrists. Here are a few thoughts that are guiding the writer's company in their use. First is the problem of really working with the person who is being appraised. It is most important that the supervisor should not make the interview just an excuse for backpatting or for

picking out weaknesses. The interview has a definite, practical, and constructive aim. Mere sweetness and light will not produce results, but neither will a negative approach. In other words, we seek a joint analysis of a man in relation to his job, so that both will benefit. Next there is the problem of group judgment; the modification, if necessary, of the views of an immediate supervisor by other members of management who also have personal experience with the man being reviewed. There are both *pros* and *cons* for this procedure. The big advantage is that the individual is protected against arbitrary dislikes. To some extent, this appraisal procedure becomes an examination of a supervisor's ability to deal with his own people. This advantage seems to outweigh possible sources of trouble. For example, a forceful personality in the review group may distort the actual findings or, having a clash of views, lead to a watered-down judgment. In a company such as the writer's, men may have been working together for a number of years, and have developed social relations that cut across organization levels. It is not always easy in such a situation to have the objectivity that first-rate appraisal requires.

Promotions

One purpose of personnel reviews is to appraise promotional opportunities for men and women and to consider what can be done to guide them towards it. This is a sensitive relation area, requiring real personal knowledge. The need for management talent is acute in all progressive companies today. Most positions require the ability to deal with other people and to handle large staffs. The job satisfaction of a lot of people can, therefore, be affected by a single promotion. There is a need to be fair to the group; there is also the need to be fair to the individual.

Some promotions look fine on the surface, but there are hidden snags. Some careers are hindered rather than advanced by promotions that come too quickly, when good men suddenly find themselves out of their depths. Family situations may also arise when the promotion involves a geographic move. If a wife finds it hard to adjust to her husband's new responsibilities and location, the man will find it hard to do the kind of job expected of him, and the kind of job he wishes to do.

How much then should a company look into an individual's personal life when reviewing him for promotion? Where is the frontier of familiarity that supervisors should not attempt to cross? Much has been said in recent years about company wives, and how unjustified prying can easily result in the loss of good men who resent what seems to them an octopus-like approach. On the other hand, one cannot ignore entirely family background especially when the appointment involves taking an active part in community affairs. The ability of the family unit to adjust to new circumstances and to be helpful must be among the factors considered.

The basic fact then is that the extent to which one knows the people who work for him should be determined primarily by the needs of the job. Supervisors should take a friendly interest in what happens to their people, for example call on them and assist them if they are ill; be aware of their family concerns. But such efforts may boomerang if they are not part of a supervisor's basic attitude to his responsibilities. You may take a man who is incompetent and give him a course in human relations, but unless you really affect his attitude, you will continue to have an incompetent man on your hands.

Conclusion

Much can be done through training to develop good personal relations. But the training has to start early, and be maintained. It should not be related solely to the needs of subordinates. There is the need also to understand the problems of the man above. A pressing need in large organizations is to get people to work easily with members of other departments. A sense of personal responsibility will help most of all. Some blame everything on impersonal forces. "They" won't cooperate. I'm only carrying out "their" instructions. How am I expected to know what "they" want? A sense of personal responsibility forces a man to go beyond such justifications. It is a key to good personal relationships. **s/p/a**

A Blueprint for a Work Simplification Program

A system of instructing employees in work simplification to enable them to improve their jobs

Loren E. Waltz

● When the management of X Company, a midwestern industrial and automotive parts wholesale firm, was faced with the problem of reducing office costs, it went about it in a systematic manner. This included instructing employees in work simplification so that they could apply improvement formulas to their jobs. The author served as the instructor-coordinator.

What We Tried to Accomplish

The work simplification program at X Company was designed to accomplish two things: The first objective naturally related to increasing company profit through cost reduction, procedural improvement, and increased employee efficiency; the second was to help employees earn a greater share of the profits of the firm through a recently installed profit sharing plan.

Initial Steps

Preparatory to conducting the work simplification training program, the instructor made visits to the firm to become familiar with current procedures, tasks performed by employees, and to become acquainted with the employees who would be trained. Procedure flow charts were constructed to provide a bird's-eye view of procedures in the firm.

Building the Program Outline

A ready-made program which met completely the needs of X Company was not available. Descriptions of successful programs which appeared in the business literature were reviewed, and ideas were gathered from those who had experience with training programs in related areas. A great part of the work simplification efforts described apparently had been directed at the supervisory level in large offices. The program at X Company was to serve all participants—executives, buyers, stenographers, clerks, floor managers, etc. Approximately 65 people participated. It was designed for six or seven class sessions. The following outline identifies the content.

LOREN E. WALTZ is an assistant professor of business education and office management, Indiana University. He has BS, MBA, and DBA degrees from Indiana University and is a member of many professional associations including SPA, NOMA, and AMA. Dr. Waltz is working on a text in systems and procedures.

A Work Simplification Training Course

This course is based upon the following:

1. Principles and methods of work simplification will be presented in class sessions.
2. Problem-solving will be developed with small groups working on a selected process or activity with the instructor.
3. Individuals will be encouraged to select real problems for which they will develop tentative solutions for consideration by management.

Session I—Introduction to Work Simplification

1. The economies of work simplification —the need.
2. What work simplification is—concept and definition.
3. What work simplification is not.
4. The method of the training course.
5. The target approach—objectives.
6. The importance of people and their attitudes in work simplification.
7. Getting started with a "lick the problem" challenge.

A Lesson in Work Simplification

What is work simplification?

What are the objectives of work simplification?

What are typical areas in office operations where work simplification is profitable?

How can we get started in work simplification?

What are the basic steps in simplifying work?

What are the tools used in work simplification?

What are the expected outcomes?

Figure 1

Assignment No. 1. Select a problem related to your job which you would like to have solved. Describe it on the problem sheet and propose a solution.

Session II—Getting the Feel of Work Simplification

1. The logical (scientific) approach to problem solving.
2. Selecting a job to be improved.
3. Identification of the action elements of a task—make-ready, do, put-away.
4. The improvement formula—eliminate, combine, change, simplify.

Assignment No. 2. Select a number of tasks which you perform; classify the steps into *make-ready, do,* and *put-away* activities. Apply the improvement formula to as many of these as you can.

Session III—Collecting the Facts

1. How to gather and organize facts.
   a. Flow process chart.
   b. Flow diagram chart.
   c. Film, The Flow Process Chart and How to Use It."
2. *Analysis* of flow process chart data.

Activity: Construct a flow process chart in class.

Assignment No. 3. a. Select a job for improvement. b. Chart the job; a flow process chart and a flow diagram.

Session IV-V—The Work Method

1. Principles of motion economy applied to office activities.
2. Work station.
3. Work unit.
4. Flow of work and office layout principles.
5. Work organization.
6. Operation chart.

Activity: Discuss process charts prepared as Assignment No. 3.

Assignment No. 4. Select a bottleneck task and study the existing method. Develop a better method. Chart it.

Session VI—Work Simplification through Improved Design of Forms

1. The importance of forms in the information processing function of the office.
2. The systems concept of forms functions
3. Principles of forms design.
4. Writing methods and their relation to forms design and use.

Activity: Discuss selected forms used by X Company; look for the application or violation of principles.

Assignment No. 5. Redesign an existing form to conform with accepted principles.

Session VII—Summation

1. Review the foregoing sessions.
2. Consider work simplification as a continuing integrated activity.
3. Consider the preparation of new ideas for presentation; the tryout.
4. Install the new method; procedural development.
5. Improve office procedures, methods, and practices continuously.
6. Plan for the continuation of work simplification in the company; additional supervisory training in analysis and design; group work plans.
7. Work with management to make major improvements in the office.

Getting Started

Participating employees needed to understand that the program was for their benefit as well as that of the firm. In the initial meeting with the instructor, the president of X Company reported that the company had started an employee profit sharing plan but had done nothing as yet to prove to the employees that the plan would really work. The implementation of a work simplification training program was one way management believed employees could help themselves to a greater share of profits.

To present the nature of the program to employees, small group orientation sessions were scheduled for all participating employees. The instructor was introduced and his role explained; the method and purpose of conducting the program were described. The orientation session was conducted in an informal manner, with the president carrying the greater load in "selling" the idea for two reasons: First, approval of the program by the president was evident to the employees because he was giving time to explain it and had brought an instructor in from the university to conduct it. Second, the president's enthusiasm for the program was communicated to the employees. The program was launched, therefore, with a good understanding between management and employees as to purposes and expected outcomes. At the close of the orientation sessions each employee was asked to tell, if he could, what such a program could mean to him personally as well as to the company. Questions about the program were encouraged and answered at the time.

The Program Starts

Schedules had to be adjusted so that no department was left "open" during a training session. Such a schedule was prepared, and employees were assigned accordingly.

Sessions were on company time. The schedule was signed by the president and was duplicated and given to department heads and employees participating in the program. If a person could not attend at his scheduled time, he made up the session with another group. Groups consisted of no more than ten, and included members of management. For example, one group consisted of the president, a foreman, a shipping clerk, and several clerical workers. It seems desirable not to have more than one executive in a group.

The First Session

The first session of the program was crucial —it had to succeed, it had to hold interest, and it had to stimulate interest in what was to come. Through visual aids, coupled with a bit of showmanship, and by getting everyone into the discussion in one way or another, the first sessions moved along dynamically. What the economics of work simplification could mean to the firm was shown with a simple flannelgraph. The "what's in it for

lick the problem

Name

Department

A problem is a perplexing question, situation, or person; a matter involving difficulty in solving, settling, or handling.

Example 1. Mail opening and sorting. To be sure that I have extracted all of the contents from an envelope, especially the large manila envelopes, I have to visually inspect the inside of each one. This adds several minutes to the processing time on a heavy run of mail. How can I lick this problem?

STARTERS FOR THE USE OF THE LICK SHEET

1. Consider your total job.
2. What makes your work harder at times?
3. What irritates you?
4. What slows up your work?
5. What would you change if you could?
6. What would you change somewhere else if you could?

FIGURE 2

me" approach was briefly reviewed, and the method of conducting the sessions was again presented. A handout sheet (Figure 1) was distributed to get participants involved in the presentation. During all sessions it was necessary to be aware of the varying abilities of the participants. A few had not finished high school; others held degrees from colleges and universities. The judicious use of visual aids, films, props, and charts helped to bridge educational gaps.

The "Lick the Problem" Sheet

Probably the most effective device used during the second session was the "Lick the Problem" sheet. (Figure 2.) Each employee was asked to prepare a written description of a problem situation in his work area which he would like to have solved. If he had suggestions for solutions, he was supposed to make them in the space provided on the problem sheet. Since the next session was scheduled for three days later, each employee had sufficient time to observe his work situation and to prepare the assigned problem.

At the beginning of the subsequent session, volunteers were asked to report problems they had selected and to propose solutions. This was a very interesting opening approach Supervisors and foremen were attentive to problems of workers and workers were attentive to the problems of management. A brisk discussion usually followed the identification of each problem. Discussions were limited to a few minutes so that as many problem situations as possible could be reviewed in 15 minutes or so. The group, it seems, would have discussed problems the entire session. But, when interest was at high pitch, the discussion was closed, the problem sheets were collected, and the next subject was pursued. The problem sheets became the basis for individual discussions later with those who reported problems, or they were used to spot areas where detailed study of operating procedures appeared to be desirable.

The second session moved into the simplification of work by breaking a task into distinguishable components. Each partici-

pant was again given homework to prepare for the next session.

The third session considered collecting and presenting facts. As an aid to this essential part of any improvement work, the flow process chart was introduced. Simple, short illustrations were drawn from the office situation and used to teach how the chart could be effective in highlighting inefficiencies in clerical processes. At the close of the third session, each trainee was asked to make a process chart of the steps of a task which he performed in his job. An attempt was made each time to give employees a "forced" opportunity to apply the new things learned. Between sessions, the instructor visited work areas and checked on the progress employees had made on assignments. As expected, not all employees did equally well. During the visits, the instructor had an opportunity to help some prepare their charts, and to do an "at-the-desk" type teaching that clarified and enlarged understanding. Another favorable outcome of the visits was the spotting of particularly good charts or ideas that made excellent illustrations for class discussion.

At-the-Desk Instruction

During casual visits the instructor might ask the employee "Do you have any suggestions?" This frequently initiated opportunities to teach additional applications of work simplification techniques. A limited number of projects were undertaken by the instructor which involved major procedural changes. In every instance, the active participation of the employees involved in the projects was invoked so that the project became a joint undertaking. Credit for improvements was given to employees even though many ideas had to be planted inconspicuously.

Some Results

A technique used to get training sessions off to a congenial start was to ask for volunteers to report the results of their attempts to apply what they had learned and in some cases to describe the changes they had made. As a part of the overall training strategy, suggestions which could readily be applied in the office or warehouse were *acted* upon. This was done for two reasons: (1) To reveal that ideas generated by the trainees were useful and workable and (2) to show that management would act upon reasonable plans for work simplification. For example, a secretary suggested that a set of files be located nearer her desk in place of other less used files. Having charted her procedure she had become aware of unnecessary steps involved in daily trips to the files. A suitable time selected for the changes was after lunch while employees were getting settled for the afternoon's work but were not too settled as to fail to notice the activity in the area. We wanted people not only to believe that we would act on good suggestions, but to see evidence of action.

In an early session, an order editor commented on the problems of handling credit memorandums. Because of certain returned goods procedures permitted in the firm, the issue of credit memos was frequently delayed several days to several weeks. Management had not been aware of these longer delays and, when the problem was emphasized, they were anxious to correct the situation. This problem was more complex than most of those reported and its solution required more time and the involvement of more people. However, of flexibility of our program permitted it. Class sessions were not scheduled on Fridays because of week-end rush. This enabled the instructor to pursue such suggestions as the foregoing and to help people involved design workable changes. In the foregoing situation, several improvements were made in the operating procedures which did not require major systems changes. Major systems changes were approached cautiously because of the adverse effect major systems errors could have on the acceptance of the program, both by management and employees.

In the normal turnover of employees, each vacant job was studied to see what could be eliminated, combined, or simplified. Positions which could be absorbed by others made more funds available for the profit-sharing plan. Two full-time positions were absorbed after some unnecessary paper work was eliminated and improved procedures were developed.

Work Groups

At the end of the seven sessions, employees who performed similar or related work were

assembled into discussion groups, informally organized. The purpose was to consider common problems while, at the same time, provide opportunity for the instructor to continue leading the search for easier and better ways to do essential tasks. During these conferences, principles and ideas presented in the formal class sessions were appropriately injected into the discussion as problems were considered and possible solutions discussed. In the terms of an educator, this was "reinforcement" of learning.

One of the aims of the conferences was follow-up; to help employees prepare their ideas for presentation to their supervisors. In a number of instances, employees discussed their ideas with the instructor but were reluctant to take them to their supervisors because they felt uneasy about their ability to make a suggestion, were afraid it would be turned down, or that the supervisor would get the idea they were stepping out of place. Many of the people lacked tact in approaching their supervisors and stated suggestions so that they seemed to be complaints. For example, the shipping department supervisor was a capable man who frequently had good ideas but could not present them so that they seemed workable. He would not carry through a discussion of an idea when management began to question certain aspects of it. To help develop this supervisor, a situation was rigged to provide an opportunity for him to present a well-thought-out suggestion to his boss. The instructor worked with the supervisor in developing the plan of presentation and its justification. The instructor was intentionally not present when the presentation was made and the supervisor was on his own. He was successful.

Work Flow and Work Organization

A problem that became evident to all participants was that of inefficient flow of work caused by the office layout. A complete layout study was initiated and the ideas and opinions of all were solicited. Consultations were held with various supervisors, key people, and clerks. As layout charts were developed they were of considerable interest to all because here was something personally involving them and their jobs.

Conclusions

Five major outcomes grew out of the work simplification program: (1) Closer association between management and employees; (2) employees learned how to study their tasks to make them easier and simpler to perform; (3) two unnecessary positions were eliminated and the benefits went into employees' profit-sharing (4) a couple of cumbersome procedures were revised, and (5) the company obtained some valuable experience in a work simplification program.

s/p/a

BOOK REVIEWS

Systems & Procedures

Anthony Ross

Supervisors in Action, *by Joseph J. Famularo; McGraw-Hill Book Company, Inc., New York, 238 pp., 1961, $4.75.*

This book suggests realistic solutions to many problems faced in the day-to-day managing and directing of people in business and industry.

Stressing that people are an organization's biggest problem and richest resource, the book offers tested techniques and new insight for improving the supervisor's ability to

manage people. It covers interviewing, selecting and placing people, training, appraising, and developing individuals.

The book also covers disciplinary techniques; improving morale; increasing production; understanding problem employees; handling employee problems; the how, when, and why of delegating; using time efficiently; and developing good public relations.

The book reflects findings from studies conducted by psychologists, personnel people, training directors, and management consultants. The findings are woven into the discussions which cover such topics as the manager's job, understanding himself; and his ability to get employee action. Special topics covered include listening as a way to better supervision, evaluating employee performance, learning to recognize the need for employee training, and administering the union contract. *(Reviewed by John Corliss, Chase Manhattan Bank, New York; Lincoln Square Chapter, SPA.)*

Transmission of Information, *by R. M. Fano; M.I.T. Press, Boston, Mass. and John Wiley & Sons, New York, 1961, $7.50.*

This book is directed to graduate students and engineers interested in electrical communications. It covers the statistical theory of communications. It is a recapitulation of lectures at MIT.

Fundamental coding theorems have been analyzed ever since the "key pounders" went into business transmitting the Morse Code. Professor Fano is in electrical communications at MIT and is a member of the research laboratory of electronics. He follows in the footsteps of Norbert Weiner (Cybernetics) and Dr. C. E. Shannon.

The period covered is from 1947 to 1961 in considerable detail. It emphasizes points of view and methods of analysis which are most likely to be useful to students researching communications.

Various models of communication theory are examined. However, the models differ mathematically in significant ways. Dr. Weiner assumed that the signal could be processed after it had been corrupted by noise. Dr. Shannon assumed that the signal could be processed both before and after its transmission through a noisy communication channel. The objective of both was the faithful reproduction of the original signal. These probabilistic approaches are the nuclei of this book. Weiner's theory applies to automatic control of communication; Shannon's to the more efficient utilization of communication channels.

Machine-to-machine communication is a newcomer among traditional forms of communication. Some people expect that the volume of communication between digital computers will equal that of speech communication within the next decade. Therefore, in looking at the future, we should give attention to the requirements of this type of digital communication analyses.

To recap, this book is highly technical and theoretical. It exercises your memory of square root, pie, log, and stochastic sources. *(Reviewed by Irving I. Solomon, ITT, Intelex Systems Division, New York; Lincoln Square Chapter, C.P.A.)*

Retention and Preservation of Records with Destruction Schedules, (6th edition); *Record Controls, Inc., 209 South LaSalle Street, Chicago 4, Illinois, 46 pages, 1961, $5.*

Composed of four parts plus a bibliography and an index, the publication gives detailed information about organizing a records retention program; Federal and state laws; and regulations affecting records retention, and a tabulation of over 300 common papers found in a normal business office with recommendations about the length of time they are to be retained. Clearly written and well organized, the publication should be helpful to anyone faced with records organization problems. Exhibits include a records retention analysis sheet, a records disposal authorization form, specifications for a blast damage shelter, and a tabulation of state laws about the time records must be kept for tax purposes. **s/p/a**

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Accounting Systems (2nd Ed.), Cecil Gillespie, Englewood Cliffs, N.J.: Prentice Hall, Inc., 1961, 641 pp., $12.			X			
Arithmetic of Automatic Computers (The), Norman A. Crowder, Garden City, N.Y.: Doubleday and Company, 1960, 472 pp., $3.95.				X		
Business Experience with Electronic Computers, B. Conway, J. Gibbons, and D. E. Watts, New York: Controllers Institute Research Foundation, Inc., 1960, 191 pp. $5.	X					
Classics in Management, Harwood F. Merrill (Ed.), New York: American Management Association, 1960, 446 pp., $6 to members, $9 to non-members.	X					
Computers and How They Work, James D. Fahnestock, New York: Ziff Davis Publishing Company, 1960, 288 pp., $4.95.	X					
Electronic Business Machines, J. H. Levenson (Ed.), New York: Philosophical Library, Inc., 1960, 272 pp., $15.		X				
Electronic Data Processing. An Introduction, E. Wainright Martin, Jr., Homewood, Illinois: Richard D. Irwin, Inc., 1961, 423 pp., $10.60.				X		
Electronic Data Processing and Auditing, Felix Kaufman, New York: Roland Press Company, 1961, 180 pp., $6.					X	
Engineering Data Processing Systems Design, Arthur D. Even, Princeton, N.J.: D. Van Nostrand Company, 1960, 282 pp., $6.50.	X					
Executive Control—the Catalyst, William Travers Jerome III, New York: John Wiley & Sons, Inc., 1961, 275 pp., $6.95.					X	
Financial Incentives for Management, Richard C. Smyth, New York: McGraw-Hill Book Company, Inc., 1960, 309 pp., $8.50.	X					
How to Communicate Policies and Instructions, Joseph Cooper, Washington, D.C.: BNA Incorporated, 1960, 348 pp., $14.75.		X				
Landmarks of Tomorrow, Peter F. Drucker, New York: Harper & Brothers, 1957, 270 pp., $4.50.				X		
Management and Corporations, 1958, Melvin Anshen and George Leland Bach (Eds.), New York: McGraw-Hill Book Company, Inc., 1960, 253 pp., $5.50.		X				
Management Practices, Richard C. Anderson, New York: McGraw-Hill Book Company, Inc., 1960, 302 pp., $7.		X				
Managing America's Economic Explosion, Dan H. Fenn, Jr., New York: McGraw Hill Book Co., Inc., 1961, 269 pp., $6.				X		
Men, Money, and Motivation, Arch Patton, New York: McGraw-Hill Company, Inc., 1961, 233 pp., $7.50.			X			
Modern Production Management, Elwood S. Buffa, New York: John Wiley & Sons, Inc., 1961, 636 pp., $10.25.				X		
Practical Problems in Business Statistics (2nd Ed.), Dudley J. Cowden and Mercedes S. Cowden, Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1960, $4.25.				X		
Probability, an Introduction, Samual Goldberg, Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1960, 322 pp., $7.95.		X				
Principles of Engineering Economy (4th Ed.), E. L. Grant and W. G. Ireson, New York: The Ronald Press Company, 1960, 574 pp. $8.	X					
Progress in Operations Research (Vol. I), Russell L. Ackoff (Ed.), New York: John Wiley & Sons, Inc. 1961, 505 pp., $10.					X	
Retention and Preservation of Records with Destruction Schedules (6th edition), Chicago: Record Controls, Inc., 1961, 46 pp. $5.						X
Supervisors in Action, Joseph J. Famularo, New York: McGraw-Hill Book Company, Inc., 1961, 238 pp. $4.75.						X
Theory of Linear Economic Models (The), New York: McGraw-Hill Book Company, Inc., 326 pp.			X			
Top Management Handbook, H. B. Maynard (Ed.) New York: McGraw-Hill Book Company, Inc., 1960, 1,236 pp., $17.50.		X				
Transmission of Information, R. M. Fano, Boston: M.I.T. Press and New York: John Wiley & Sons, 1961, $7.50.						X

An Annotated Bibliography

A sampling of an extensive annotated bibliography for systems men prepared by a subcommittee of SPA's Education Committee and chaired by Maurice F. Ronayne.

Beer, Stafford, *Cybernetics and Management*, New York: John Wiley & Sons, Inc., 1959, 214 pp.

Presents the basic principles of the scientific study of the nature of control. Explains the main terms with a minimum of mathematics. Although it is unlikely that the book will be read and understood in a weekend of reading by a neophyte, it is nevertheless one of the more lucid treatments of the subject. RWR

Brown, Robert G., *Statistical Forecasting for Inventory Control*, New York: McGraw-Hill Book Company, Inc., 1959, 223 pp.

This book serves as a practical primer on designing an economical, effective, inventory control system. It emphasizes better routine short-range forecasting with suggestions for adapting a program to specific needs. Includes several of the latest techniques. Theoretical development is given with minimum of symbolic notation. The beginning of each chapter develops the concepts in non-technical terms suitable for management. RWR

Bross, Irwin, D. F., *Design for Decision*, New York: The MacMillan Company, 1953, 276 pp.

One of the earlier significant books in bringing home the questions of statistical aids to administrative decision making. It is easy to read. A sampling of chapter headings include: History of Decision, Nature of Decision, Prediction, Probability Values, Rules for Action, Operating a Decision Maker, Sequential Decision, Measurement, and Design for Decision. RWR

Churchman, C. West, *Prediction and Optimal Decision*, Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1961, 394 pp.

This volume is concerned with the relationship between problems of value and problems of fact. Specifically, it regards the question of whether "science" can verify recommendations to managers. It discusses how far a scientist can go in assisting an executive in making decisions. Illustrations are drawn from the social sciences, management sciences, and operations research. Technicalities have been kept minimal. Essential ideas are distilled from their technical content but kept intact. RWR.

EDITORIAL

THE WORLD GOES 'ROUND

● While better and faster machines contribute to progress, our reliance upon material advancement seems sometimes to overshadow other values. To make sound progress, we must keep everything in perspective and balance. There is more to life than the manipulation of nature. Science and technology must not be allowed to crowd our spiritual, ethical, and esthetic values. In developing science—things—man must not overlook the other factors and our heritage. Coordinating all elements that affect man, science can be a fruitful instrument of man—not his master or destroyer.

It seems important, therefore, to pause occasionally as we work with techniques and things to think about basic truths and fundamental purposes. For man, they remain relatively simple and unchanging. It is the calling of great men not so much to preach new truths but to rescue from oblivion those old truths which it is our wisdom to remember and our weakness to forget. Progress is made by people, not by things. When a scientist says "The world's future is in the hands of the engineer," he does not mean it is in his hands because he builds computers or bombs. His chief service alone is not in building machines. His chief service lies in building things that will better serve man; that will free man for higher pursuits.

It would not take much to destroy completely our present way of life. This destruction can be accelerated and assured if we forget one word—love.

Think of the kind of world we'd have if we forgot love of humanity, love of our fellow men, love of nature. One sometimes wonders today whether the world hasn't really forgotten love and become too successful materially. Our newspapers and broadcasts are full of illustrations of where material values have taken precedence over fundamental values: a yearly average of 10,000 murders, 20,000 suicides, 5 million serious crimes, and $500 million misappropriated. When love leaves, hate enters and the price of hate is staggering. Men concentrate on destroying rather than helping one another. World War II alone is reported to have cost four hundred billion dollars ($400,000,000,000) in property loss. This amount would give every family in the United States, Great Britain, France, Belgium, Germany, and Russia, $3,500 toward the purchase of a home. After that, there would be enough left over to give every city of 200,000 inhabitants or over a $5,000,000 hospital and a $10,000,000 university. But this was not the only cost of hate in World War II. There was the further cost of thirty million lives—the countries' best and healthiest young men and women. The loss of such talent and vitality is truly irreplaceable.

A judge in Missouri once said at a trial that, "The one absolute, unselfish friend a man can have in this cold, selfish world; the one that never deserts him, the one that never proves ungrateful or treacherous, is his dog." It is a sad commentary that an animal loves more magnificently than a human being.

Gillespie, Cecil, *Accounting Systems Procedures and Methods,* 2nd Edition, Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1961, 641 pp.

Probably the most widely read book on accounting systems analysis and design. Explains thoroughly how a survey is made and a new accounting system designed. After describing how the character of systems work is changing, the book demonstrates what manufacturing management gets from each of its procedures and how the procedures work in today's accounting. Up-to-date information on electronic data processing, punched card accounting, and cost accounting is included. RWR

Knox, Frank M., *Design and Control of Business Forms,* New York: McGraw-Hill Book Company, Inc., 1952, 226 pp.

Covers the fundamentals of administrative control over business forms as they affect paperwork and clerical expense in the office or plant. Also explains the technical operations involved in the designing and purchasing of forms. Describes the "Functional Index" as a method of analyzing and classifying forms. RWR

Kozmetsky, George and Paul Kirsher, *Electronic Computers and Management Control,* New York: McGraw-Hill Book Company, Inc., 1956, 289 pp.

Written primarily for business executives to explain new developments in EDP. Describes functions, components, operating methods, and various applications of computers; administrative problems of their introduction; their influence on management planning and control; concepts of integrated business systems; and role of executive in electronic system selection. Four appendices on Language of Computer Programming, EDP Equipment, and A Mathematical Model for an Integrated Data System. NLS

Lazzaro, Victor, Ed., *Systems & Procedures,* Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1959, 464 pp.

Excellent source book with chapters by well-known practitioners: Systems Analysis, Concepts, Charting, Auditing, Work Simplification, Work Measurement, Forms Control, Records Management, Budget, Tab Equipment, ADPS, Research, and Selecting and Training Systems Men. Contributors include: William A. Gill, Richard Pomeroy, Richard Neumaier, Gibbs Myers, William Buhl, David Hertz, and Elles Derby. MFR

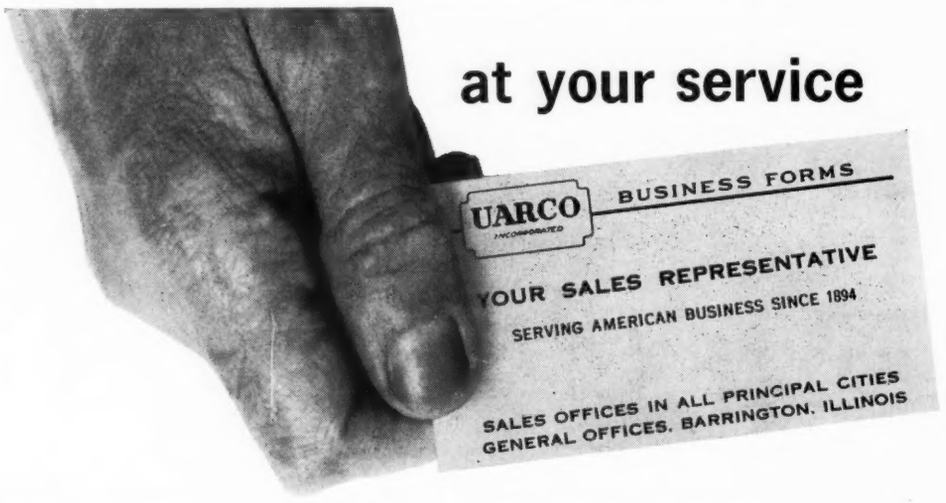
How much better would our business progress be if our actions were motivated by love. Do we not operate too much in our highly competitive industrial society on the rule that there is no room for the weak? One definition of a businessman you know is "A person who is not himself on Sunday."

If the removal of "love" can make the world an unfit place in which to live and do business, will the development of love make it better? This writer believes that more brotherly love is the only answer to international difficulties. Nothing is settled properly by force. Wars do not prove who is right; they merely show who is left. Both sides really lose. The answer to atomic power is not hydrogen power; the answer is moral power.

For real success then in life and business, let's not put all our trust in man-made laws and our destinies in technological improvements. Significant as these may be, we need something else. Let's pay more attention to the original set of rules, so simple that it was carved on two stone tablets, so comprehensive that the rules have stood the test of time and do not need to be revised or amended. We can never settle the world's problems with arms alone. We can never enjoy complete success in business with machines alone. Let us train our

hands—to work well,
heads—to learn well,
hearts—to live well.

(by Wilbert E. Scheer, Personnel Director, Blue Cross-Blue Shield, Chicago, Illinois). **s/p/a**



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March, James G. and Herbert A. Simon, *Organizations,* New York: John Wiley & Sons, Inc., 1958, 248 pp.

A comprehensive inventory of the present state of organization theory. Covers *formal* organizations only. The 7 chapters cover: Organizational Behavior; "Classical" Organization Theory; Motivational Constraints: Intraorganizational Decisions; The Decision to Participate; Conflict in Organizations; Cognitive Limits on Rationality; and Planning and Innovation in Organization. NLS

Maynard, Harold B., Ed., *Industrial Engineering Handbook,* New York: McGraw-Hill Book Company, Inc., 1956, 1511 pp.

A comprehensive handbook on industrial engineering containing 74 articles on different facets of the field. Contains 8 sections: The Industrial Engineering Function; Methods; Work Measurement; Predetermined - Elemental - Time Standards; Wage Payment; Control Procedures; Plant Facilities and Design; and Other Aspects of Industrial Engineering. NLS

McCracken, Daniel D., Harold Weiss, and Tsai-Hwa Lee, *Programming Business Computers,* New York: John Wiley & Sons, Inc., 1959, 510 pp.

This volume is directed to the reader who lacks an extensive background in math. but who is, or expects to be, involved in applying electronic computers to business. First, background information is supplied (nature of data processing, concept of the file, flow charting). Then basic computer coding techniques are described. Next, "advanced concepts" are covered (sorting, estimating computer time, random access storage). The final two chapters deal with setting up computer applications and with accounting and auditing considerations. RD

Neuschel, Richard F., *Management by Systems,* New York: McGraw-Hill Book Company, Inc., 1960, 359 pp.

A comprehensive revision and updating of his early book, *Streamlining Business Procedures.* New chapters: Integrated Management Reporting Systems, Conducting Computer Feasibility Studies, and IDP Concepts and Applications. The remaining material has the Role of Procedures in Management, Organizing for Procedures Improvement, Top-Management Approach to Systems and Procedures, and Administering the Systems and Procedures Effort. "Must" reading for anyone interested in becoming a broad-gauged administrative analyst and problem solver. RD

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Newman, William H., *Administrative Action,* Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1951, 483 pp.

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Reinfeld, Nyles V., *Production Control,* Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1959, 339 pp.

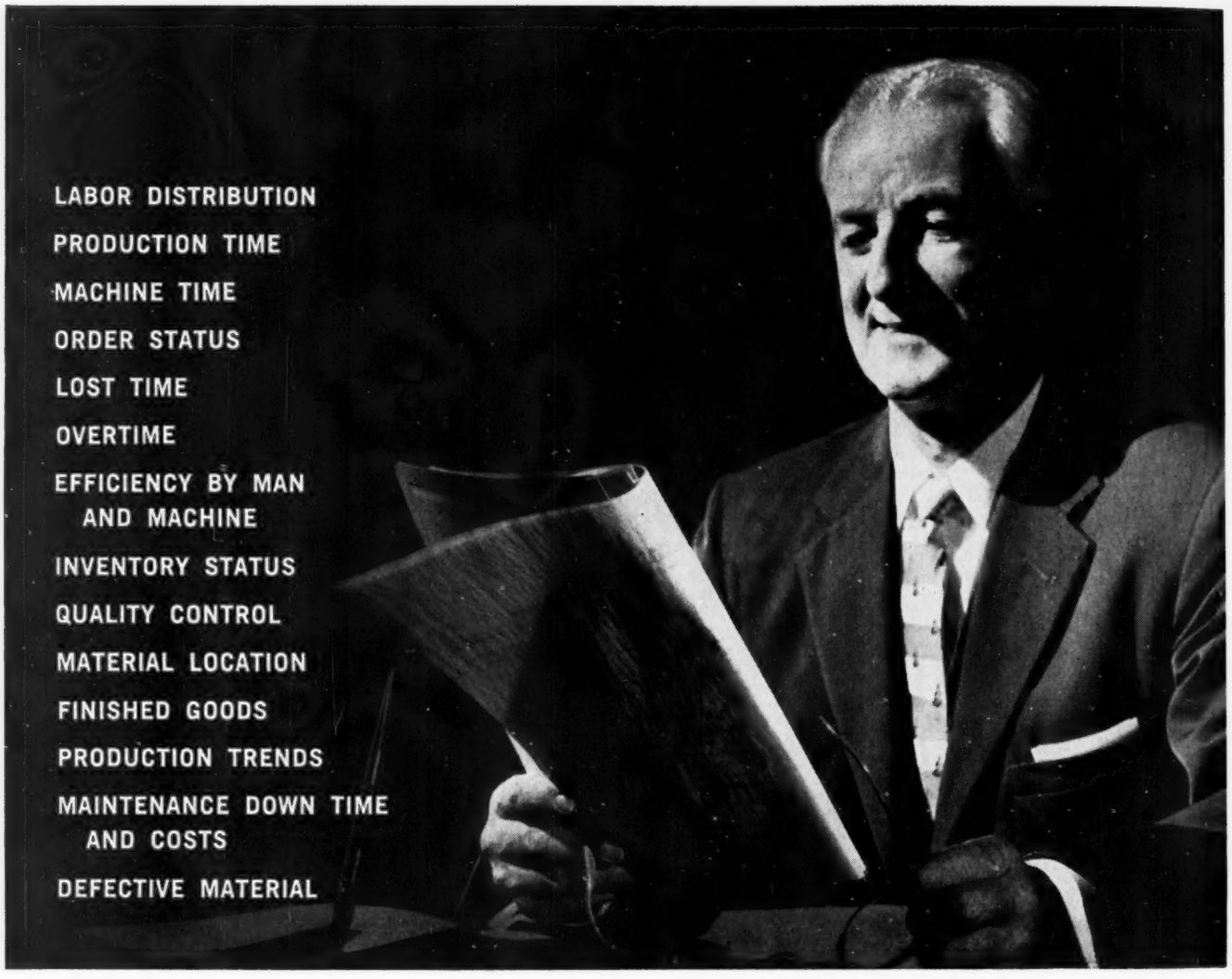
This book is packed with detailed information on scheduling, planning, controls, forecasting, managing and controlling inventories, and other phases of the production control function within today's businesses. The author states, and supports, the thesis that production control is the most fertile training ground for top management people. Many sample forms and charts are included. RR

Reinfield, Nyles V. and William R. Vogel, *Mathematical Programming,* Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1958, 247 pp.

Major objective of this book, according to authors, is to bridge gap between techniques of mathematical programming and application to business problems. Fundamental techniques are explained so readers lacking extensive mathematical background can absorb them. Examples are given of applications to business problems. The whole emphasis is on a practical approach to mathematical programming, sacrificing some of the preciseness of the theoretical approach. The problem of obtaining management acceptance of *mp* is discussed thoroughly. MFR

Sasieni, Maurice, Arthur Yaspan, and Lawrence Friedman, *Operations Research: Methods and Procedures,* New York: John Wiley & Sons, Inc., 1959, 316 pp.

This book is intended to fill the need for a textbook in the mathematics of operations research. It contains illustrative problems and exercises based on material from courses at Case Institute of Technology. While written for a person who knows calculus, it contains useful information for one with only a background of high-school algebra. Increasing application of mathematics to business administration makes it imperative that all systems analysts learn about operations research methods and procedures. MFR



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